Life course consequences of breastfeeding

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The study by Cesar G Victora and colleagues[1] in *The Lancet Global Health* is an impressive long-term follow-up of a large sample, which included almost 3500 participants in Brazil who were followed up from birth in 1982 to 2012–13, at the mean age of 30·2 years. The exposure was breastfeeding and the outcome variables were intelligence—as assessed by a widely used intelligence test (Wechsler Adult Intelligence Scale, 3rd version)—educational attainment, and income. The study contributes important knowledge about three issues related to the effects of breastfeeding on cognitive development: first, the study's findings show the effects of breastfeeding in a cultural and economic setting without strong social patterning of breastfeeding; second, the study investigates long-term effects of breastfeeding during a substantial part of the full lifespan; and third, the study describes life course consequences of breastfeeding by incorporating socially important outcomes, such as education and income.

If the reported effects of breastfeeding are the result of confounding by maternal intelligence and other maternal characteristics associated with breastfeeding, the effect estimates would be expected to differ between countries and cultures with different social patterns of breastfeeding. In fact, an argument exists[2] that comparisons of the effects of breastfeeding in contexts with substantial differences in social patterning of breastfeeding might contribute to the ongoing discussion of breastfeeding as a causal factor in cognitive development versus residual confounding as an explanation for the apparent effects. From this perspective, the fact that blood pressure and BMI were associated with breastfeeding in a British study, but not in a previous Brazilian study, which still identified an association between breastfeeding and intelligence, is surprising.[2] Victora and colleagues' study[1] is from the same area of Brazil as this previous study. The investigators[1] incorporated adjustment for ten potentially important confounding factors, such as gestational age, birthweight, maternal smoking during pregnancy, and maternal prepregnancy BMI. Findings from a 2013 study[3] suggest that the most important confounding factors in studies of cognitive development might be parental intelligence and education, and the results of another study[4] suggested that most apparent effects of breastfeeding might be caused by the confounding effect of maternal intelligence. Victora and colleagues[1] were unable to control for maternal intelligence, but in 1982, no strong social patterning of breastfeeding existed in the cohort[2] and, according to the authors, awareness of the potential benefits of breastfeeding was uncommon in Brazil at the time. In this setting, controlling for maternal intelligence would be less important, although notably, the highest prevalence of breastfeeding at 6 months was in the subsamples with longest maternal schooling and highest family income. However, as the authors point out, adjustment for confounding factors increased the effect estimates, which seems to make residual confounding less likely. Furthermore, the findings are supported by those of studies about the effects of breastfeeding on cognitive development in randomised trials,[5] and observational studies that control for maternal intelligence.[6]

Although the long-term stability of childhood intelligence during the life course has been shown in longitudinal studies,[7] studies of the long-term effects of breastfeeding are important. With age, the effects of early developmental factors might either be diluted, because of the effects of later environmental factors, or be enhanced, because cognitive ability affects educational attainment and occupational achievements. Birthweight is an example of a developmental factor that has often been associated with intelligence in childhood, but this effect might not persist into midlife.[8] By contrast, Victora and colleagues' study[1] suggests that the effects of breastfeeding on cognitive development persist into adulthood, and this has important public health implications.

Previous studies with long-term follow-up have investigated effects on intelligence[9] and education,[10] but no studies seem to be available for associations between breastfeeding and income in adult life. Many studies have shown associations between intelligence, education, and occupation.[11] Thus, studies that show the effects of breastfeeding on educational achievement in adolescence would be expected to show the association of breastfeeding with education and income. Victora and colleagues[1] show that children who were breastfed

maintain this cognitive and educational advantage until at least their early 30s, and this advantage is associated with increased income. The results of Victora and colleagues' mediation analysis suggest that the crucial developmental path is the effect of breastfeeding on cognitive development. However, a model that only incorporates intelligence and income seems too simple, since much evidence suggests that intelligence affects education, which is an important determinant of occupation and income.

The findings from this Brazilian cohort[1] suggest that breastfeeding might have long-term effects on intelligence in a population without strong social patterning of breastfeeding, and this effect might mediate effects on life outcomes, such as educational attainment and income. However, these findings need to be corroborated by future studies designed to focus on long-term effects and important life outcomes associated with breastfeeding.

Erik Lykke Mortensen
Department of Public Health and Center for Healthy Aging, University of Copenhagen, Copenhagen, Denmark
elme@sund.ku.dk

I declare no competing interests.

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